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REMARKS/ARGUMENTS

In the Preliminary Amendment filed September 23, 2004, original Claims 1 to 11 were canceled and redrafted as newly submitted Claims 12 to 26 in order to place the claims in the proper format. Claim 12 has now been amended to incorporate the content of Claims 13 (80 mole% isoprene), 16 (99 mole% styrene) and 26 (self adhesive shingle or roofing felt) therein. Accordingly, Claims 13, 16 and 26 have been canceled. Claims 15 (80 mole% styrene) and 24 (use of bituminous composition) have also been canceled. Claims 23 and 25 have been amended to incorporate the isoprene and styrene mole% included in Claim 12, as amended. Claim 25 has also been placed in independent form. Dependent claim 27 has been added to claim a more narrow embodiment of the present invention. In view of the above, Claims 12, 14, 17 to 23 and 25, as amended, and newly added Claim 27 are pending in the present application.

The Examiner rejects Claim 24 under 35 U.S.C. § 112 as being indefinite and also under 35 U.S.C. § 101 as being an improper definition of a process. Claim 24 has been canceled. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 112 and 35 U.S.C. § 101 be withdrawn.

The Examiner rejects Claims 12 to 26 under 35 U.S.C. § 103(a) as being unpatentable over Vonk et al, U.S. Patent No. 4,904,713 (hereinafter referred to as "Vonk et al"), in view of Agostinis et al, U.S. Patent No. 4,874,821 (hereinafter referred to as "Agostinis et al"). This rejection is respectfully traversed with regard to pending Claims 12, 14, 17 to 23 and 25, as amended, and newly added Claim 27.

Claims 12, 14, 17 to 23 and 25, as amended, and newly added Claim 27 are patentable over Vonk et al in view of Agostinis et al since Vonk et al fails to teach a bituminous composition comprising a bituminous component and a specific block copolymer of the general formula $S_1-B_1-S_2-B_2$ wherein the weight ratio of B_1 over B_2 is from 3.0 to 12.0 and Agostinis et al, while disclosing a tetrablock copolymer, fails to

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disclose the specific block copolymer of the present invention as well as fails to indicate that the block copolymers of Agostinis et al can be successfully used in bituminous compositions. In addition, Vonk et al, considered in view of Agostinis et al, do not teach the specific block copolymers of the present invention nor the coatings of the present invention.

The bituminous composition of the present invention comprises a bituminous component and a block copolymer of the general formula $S_1-B_1-S_2-B_2$ wherein S_1 and S_2 are monovinylaromatic hydrocarbon polymer blocks comprising at least 99 mole % styrene and B_1 and B_2 are conjugated diene polymer blocks comprising at least 80 mole% isoprene. In the block copolymer of the present invention, the weight ratio of B_1 over B_2 must be in the range of 3.0 to 12.0. The present invention further comprises the block copolymer utilized in the bituminous composition, as well as a coating that comprises the bituminous composition described hereinbefore.

Vonk et al is directed to a bituminous composition that comprises (a) bitumen; (b) at least one elastomeric block copolymer having at least two polymerized alkenyl arene blocks and at least one polymerized conjugated diene block; and (c) a monoalkenyl arene polymer. In column 4, lines 1 to 4, Vonk et al indicate that "[a]lternatively, additional A and/or B blocks may be grown via sequential addition of the respective monomer to produce a linear polymer, e.g., A-B-A, A-B-A-B, etc." However, this generic disclosure cannot be considered to teach or suggest that by using tetrablock block copolymers such as those of the present invention, of the formula $S_1-B_1-S_2-B_2$ having the weight ratio of B_1 over B_2 in the range of 3.0 to 12.0 in bituminous compositions it is possible to achieve a good balance of adhesive properties and rheological performance for these bituminous compositions. Even the Examiner admits on page 5 of the present Office Action that "Vonk et al does not disclose the weight ratio of conjugated diene block B_1 over B_2 ranging from 3.0 to 12.0" (emphasis added by the Examiner). Accordingly, Vonk et al, when considered alone, fails to render Claims 12, 14, 17 to 23 and 25, as amended, and newly added Claim 27 obvious.

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The Examiner cites Agostinis et al to overcome the insufficiencies of Vonk et al. Applicants maintain that this reference, when considered with Vonk et al, also fails to teach or suggest the present invention. Agostinis et al discloses a linear copolymer of the general formula B1-A1-B2-A2 wherein B1 and B2 are polydienic blocks, preferably polybutadiene blocks, A1 and A2 are polyvinylaromatic blocks, preferably polystyrene blocks, the weight average molecular weight of B1 block is from 0.1 to 0.5 times the weight average molecular weight of the B2 block, and the weight average molecular weight of the A1 block is from 0.25 to 2.0 times the weight average molecular weight of the A2 block.

In other words, Agostinis et al teaches a tetrablock copolymer having two styrene blocks, A1 and A2, and two polybutadiene blocks, B1 and B2, wherein the A1 block is from one quarter to two times the size of the A2 block and wherein the B1 block is from one tenth to one half the size of the B2 block. Agostinis et al go on to indicate "[t]he present Applicant found, according to the instant invention, that some linear copolymers, constituted by alternating polybutadiene and polystyrene blocks, having a particular structure and distribution of the individual blocks, are able to display an unexpectedly good balance of characteristics." While Agostinis et al in the broad sense indicate that the B1 and B2 blocks are "polydienic blocks", the discussion, including the examples, are based on polybutadiene blocks. Agostinis et al mention in column 2, lines 59 to 61, that "the same advantages, or similar advantages, are achieved, when butadiene is replaced by other dienic monomers." There is no specific mention of isoprene. Upon examining the examples included by Agostinis et al, it can be seen that what is presented is examples and results that are typically measured for hot melt adhesive compositions (note the examination of polyken tack, loop tack, peeling and holding power are typical tests utilized for adhesive compositions, not for bituminous compositions to be utilized in roofing applications). Although the background states that "[t]hese block copolymers"... [copolymers with polybutadiene and polystyrene blocks]... are widely used in the technique, such as, e.g., in the sector of adhesives, in compositions with bitumens, in

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compositions with several plastic materials, in the field of footwear, and so forth", Applicants maintain that this reference in the background is to general block copolymers. There is no indication that the polymers of Agostinis et al can in fact be used in bituminous compositions with the expectation of achieving good properties since Agostinis et al only discuss hot melt adhesives, not bituminous compositions. In addition, simply because a polymer gives good performance in traditional adhesives, it does not necessarily follow that this polymer will also work as well, or better, in other utilities (e.g., bituminous compositions for roofing applications). Without some teaching or suggestion to the contrary, it cannot be said that it would have been obvious for one skilled in the art to try other utilities (e.g., bituminous compositions for roofing applications). Accordingly, Applicants maintain that since Agostinis et al fail to teach or even suggest that the block copolymers of Agostinis et al can be utilized in bituminous compositions such as those of Vonk et al, Agostinis et al fail to overcome the deficiencies of Vonk et al. The same arguments can be made with regard to the coatings of the present invention.

Applicants further maintain that the block copolymer claimed is not obvious. As noted in column 3, lines 24 to 34 of Agostinis et al "...in a first step of polymerization, metered amounts of butadiene and styrene, mixed together, are fed, and are polymerized in solution, with a suitable catalytic system for the synthesis of the living polymers, up to a complete, or substantially complete, conversion of the monomers; in this way, a living copolymer is formed, which is constituted by two not-pure B1-A1 blocks, i.e., which are linked with each other by a copolymeric chain constituted by randomly linked monomeric units of butadiene and styrene". Accordingly, the first step does not result in two pure B1-A1 blocks. In the process of the present invention, the polymers are made by full sequential polymerization (see General Procedure for the Preparation of Polymer A, page 11 of the present application). The monovinylaromatic hydrocarbon (styrene) is polymerized first up to completion. Isoprene is added next and allowed to react until completion. Then a second portion of styrene is added and reacted until completion followed by a final portion of isoprene. This process does not result in the formation of

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"not pure B1-A1" blocks as in Agostinis et al. Accordingly, it is not obvious to replace the first step of Agostinis et al to come up with the process utilized to achieve the specific block copolymers of the present invention.

In view of the above, Applicants respectfully request that the rejection of Claims 12, 14, 17 to 23 and 25, as amended, and newly added Claim 27 under 35 U.S.C. § 103(a) as being unpatentable over Vonk et al in view of Agostinis et al, be withdrawn.

Respectfully submitted,

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By 

Their attorney, Donna Blalock Holguin
Registration Number 38,082
KRATON Polymers U.S. LLC
3333 Highway 6 South, Rm. CA-108
Houston, Texas 77082
281-668-3224 (Phone)
281-668-3155 (Fax)